THE BELL SYSTEM
TECHNICAL JOURNAL

A JOURNAL DEVOTED TO THE
SCIENTIFIC AND ENGINEERING
ASPECTS OF ELECTRICAL
COMMUNICATION

EDITORS

R. W. KING J. O. PERRINE

EDITORIAL BOARD

W. H. HARRISON
O. B. BLACKWELL
H. S. OSBORNE
J. J. PILLIOD
O. E. BUCKLEY
M. J. KELLY
A. B. CLARK
F. J. FEELY

TABLE OF CONTENTS
AND
INDEX

VOLUME XXVI

1947

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
NEW YORK

PRINTED IN U. S. A.

Physics Lib
T.
Bell Telephone Co

THE BELL SYSTEM
TECHNICAL JOURNAL

VOLUME XXVI 1947

Table of Contents

JANUARY, 1947

Development of Silicon Crystal Rectifiers for Microwave Radar Receivers—*J. H. Scaff and R. S. Ohl* 1
End Plate and Side Wall Currents in Circular Cylinder Cavity Resonator—*J. P. Kinzer and I. G. Wilson* 31
First and Second Order Equations for Piezoelectric Crystals Expressed in Tensor Form—*W. P. Mason* 80
The Biased Ideal Rectifier—*W. R. Bennett* 139
Properties and Uses of Thermistors—Thermally Sensitive Resistors—*J. A. Becker, C. B. Green and G. L. Pearson* 170

APRIL, 1947

Radar Antennas—*H. T. Friis and W. D. Lewis* 219
Probability Functions for the Modulus and Angle of the Normal Complex Variate—*Ray S. Hoyt* 318
Spectrum Analysis of Pulse Modulated Waves—*J. C. Lozier* 360

JULY, 1947

Telephony by Pulse Code Modulation—*W. M. Goodall* 395
Some Results on Cylindrical Cavity Resonators—*J. P. Kinzer and I. G. Wilson* 410
Precision Measurement of Impedance Mismatches in Waveguide—*Allen F. Pomeroy* 446
Reflex Oscillators—*J. R. Pierce and W. G. Shepherd* 460

OCTOBER, 1947

The Radar Receiver—*L. W. Morrison, Jr.* 693
High-Vacuum Oxide-Cathode Pulse Modulator Tubes—*C. E. Fay* 818
Polyrod Antennas—*G. E. Mueller and W. A. Tyrrell* 837
Targets for Microwave Radar Navigation—*Sloan D. Robertson* 852
Tables of Phase Associated with a Semi-Infinite Unit Slope of Attenuation—*D. E. Thomas* 870

Index to Volume XXVI

A

Analysis, Spectrum, of Pulse Modulated Waves, *J. C. Lozier*, page 360.
Antennas, Polyrod, *G. E. Mueller and W. A. Tyrrell*, page 837.
Antennas, Radar, *H. T. Friis and W. D. Lewis*, page 219.
Attenuation, Tables of Phase Associated with a Semi-Infinite Unit Slope of, *D. E. Thomas*, page 870.

B

Becker, J. A., C. B. Green and G. L. Pearson, Properties and Uses of Thermistors—Thermally Sensitive Resistors, page 170.
Bennett, W. R., The Biased Ideal Rectifier, page 139.

C

Cavity Resonator, Circular Cylinder, End Plate and Side Wall Currents in, *J. P. Kinzer and I. G. Wilson*, page 31.
Cavity Resonators, Cylindrical, Some Results on, *J. P. Kinzer and I. G. Wilson*, page 410.
Code Modulation, Pulse, Telephony by, *W. M. Goodall*, page 395.
Crystal, Silicon, Rectifiers for Microwave Radar Receivers, Development of, *J. H. Scaff and R. S. Ohl*, page 1.
Crystals, Piezoelectric, Expressed in Tensor Form, First and Second Order Equations for, *W. P. Mason*, page 80.

F

Fay, C. E., High-Vacuum Oxide-Cathode Pulse Modulator Tubes, page 818.
Friis, H. T. and W. D. Lewis, Radar Antennas, page 219.

G

Goodall, W. M., Telephony by Pulse Code Modulation, page 395.
Green, C. B., G. L. Pearson and J. A. Becker, Properties and Uses of Thermistors—Thermally Sensitive Resistors, page 170.

H

Hoyt, Ray S., Probability Functions for the Modulus and Angle of the Normal Complex Variate, page 318.

I

Impedance Mismatches in Waveguide, Precision Measurement of, *Allen F. Pomeroy*, page 446.

K

Kinzer, J. P. and I. G. Wilson, End Plate and Side Wall Currents in Circular Cylinder Cavity Resonator, page 31.
Kinzer, J. P. and I. G. Wilson, Some Results on Cylindrical Cavity Resonators, page 410

L

Lewis, W. D. and H. T. Friis, Radar Antennas, page 219.
Lozier, J. C., Spectrum Analysis of Pulse Modulated Waves, page 360.

M

Mason, W. P., First and Second Order Equations for Piezoelectric Crystals Expressed in Tensor Form, page 80.

Microwave Radar Navigation, Targets for, *Sloan D. Robertson*, page 852.
Microwave Radar Receivers, Development of Silicon Crystal Rectifiers for, *J. H. Scaff and R. S. Ohl*, page 1.
Mismatches, Impedance, in Waveguide, Precision Measurement of, *Allen F. Pomeroy*, page 446.
Modulated Waves, Pulse, Spectrum Analysis of, *J. C. Lozier*, page 360.
Modulation, Pulse Code, Telephony by, *W. M. Goodall*, page 395.
Modulator Tubes, High-Vacuum Oxide-Cathode Pulse, *C. E. Fay*, page 818.
Morrison, Jr., L. W., The Radar Receiver, page 693.
Mueller, G. E. and W. A. Tyrrell, Polyrod Antennas, page 837.

N

Navigation, Microwave Radar, Targets for, *Sloan D. Robertson*, page 852.

O

Ohl, R. S. and J. H. Scaff, Development of Silicon Crystal Rectifiers for Microwave Radar Receivers, page 1.
Oscillators, Reflex, *J. R. Pierce and W. G. Shepherd*, page 460.

P

Pearson, G. L., J. A. Becker and C. B. Green, Properties and Uses of Thermistors—Thermally Sensitive Resistors, page 170.
Phase, Tables of, Associated with a Semi-Infinite Unit Slope of Attenuation, *D. E. Thomas*, page 870.
Pierce, J. R. and W. G. Shepherd, Reflex Oscillators, page 460.
Piezoelectric Crystals Expressed in Tensor Form, First and Second Order Equations for, *W. P. Mason*, page 80.
Polyrod Antennas, *G. E. Mueller and W. A. Tyrrell*, page 837.
Pomeroy, Allen F., Precision Measurement of Impedance Mismatches in Waveguide, page 446.
Probability Functions for the Modulus and Angle of the Normal Complex Variate, *Ray S. Hoyt*, page 318.
Pulse Code Modulation, Telephony by, *W. M. Goodall*, page 395.
Pulse Modulated Waves, Spectrum Analysis of, *J. C. Lozier*, page 360.
Pulse Modulator Tubes, High-Vacuum Oxide-Cathode, *C. E. Fay*, page 818.

R

Radar: High-Vacuum Oxide-Cathode Pulse Modulator Tubes, *C. E. Fay*, page 818.
Radar: End Plate and Side Wall Currents in Circular Cylinder Cavity Resonator, *J. P. Kinzer and I. G. Wilson*, page 31.
Radar: Some Results on Cylindrical Cavity Resonators, *J. P. Kinzer and I. G. Wilson*, page 410.
Radar: Polyrod Antennas, *G. E. Mueller and W. A. Tyrrell*, page 837.
Radar: Reflex Oscillators, *J. R. Pierce and W. G. Shepherd*, page 460.
Radar Antennas, *H. T. Friis and W. D. Lewis*, page 219.
Radar Navigation, Microwave, Targets for, *Sloan D. Robertson*, page 852.
Radar Receiver, The, *L. W. Morrison, Jr.*, page 693.
Radar Receivers, Microwave, Development of Silicon Crystal Rectifiers for, *J. H. Scaff and R. S. Ohl*, page 1.
Receiver, Radar, The, *L. W. Morrison, Jr.*, page 693.
Receivers, Microwave Radar, Development of Silicon Crystal Rectifiers for, *J. H. Scaff and R. S. Ohl*, page 1.
Rectifier, Biased Ideal, The, *W. R. Bennett*, page 139.
Rectifiers, Silicon Crystal, for Microwave Radar Receivers, Development of, *J. H. Scaff and R. S. Ohl*, page 1.
Reflex Oscillators, *J. R. Pierce and W. G. Shepherd*, page 460.
Resistors, Thermally Sensitive—Properties and Uses of Thermistors, *J. A. Becker, C. B. Green and G. L. Pearson*, page 170.
Resonator, Circular Cylinder Cavity, End Plate and Side Wall Currents in, *J. P. Kinzer and I. G. Wilson*, page 31.
Resonators, Cylindrical Cavity, Some Results on, *J. P. Kinzer and I. G. Wilson*, page 410.
Robertson, Sloan D., Targets for Microwave Radar Navigation, page 852.

S

Scaff, J. H. and R. S. Ohl, Development of Silicon Crystal Rectifiers for Microwave Radar Receivers, page 1.
Shepherd, W. G. and J. R. Pierce, Reflex Oscillators, page 460.
Silicon Crystal Rectifiers for Microwave Radar Receivers, Development of, *J. H. Scaff and R. S. Ohl*, page 1.
Spectrum Analysis of Pulse Modulated Waves, *J. C. Lozier*, page 360.

T

Tensor Form, First and Second Order Equations for Piezoelectric Crystals Expressed in, *W. P. Mason*, page 80.
Thermistors, Properties and Uses of—Thermally Sensitive Resistors, *J. A. Becker, C. B. Green and G. L. Pearson*, page 170.
Thomas, D. E., Tables of Phase Associated with a Semi-Infinite Unit Slope of Attenuation, page 870.
Tyrrell, W. A. and G. E. Mueller, Polyrod Antennas, page 837.

V

Vacuum, High-, Oxide-Cathode Pulse Modulator Tubes, *C. E. Fay*, page 818.

W

Waveguide, Precision Measurement of Impedance Mismatches in, *Allen F. Pomeroy*, page 446.
Wilson, I. G. and J. P. Kinzer, End Plate and Side Wall Currents in Circular Cylinder Cavity Resonator, page 31.
Wilson, I. G. and J. P. Kinzer, Some Results on Cylindrical Cavity Resonators, page 410.